Claims

What is claimed is:

1. A method of reducing the audible operating noise of an electric power conversion device comprising providing a segmented commutator with slots between the segments and smoothing the brush transition between the slots to reduce brush vibration and the associated noise ordinarily created when the motor brush contacts the commutator.

2. The method of claim 1 and further comprising placing an insulating filler material in the commutator slots to thereby provide the smooth brush transition between commutator segments.

3. The method of claim 2 and further comprising providing the insulating filler material as a two-part epoxy.

4. A method of reducing the RFI electronic operating noise of an electric power conversion device comprising providing a segmented commutator with slots between the segments and smoothing the brush transition between the slots to reduce brush vibration and the associated electrical arcing.

5. The method of claim 4 and further comprising placing an insulating filler material in the commutator slots to thereby provide the smooth brush transition between commutator segments.

6. The method of claim 5 and further comprising providing the insulating filler material as a two-part epoxy.

7. The process of claim 2 and further comprising filling the commutator slots of power conversion devices with segmented commutators of electric motors.

8. The process of claim 7 and further comprising manually applying an insulating filler material to the slots of a segmented commutator using simple hand tools.

9. The process of claim 7 and further comprising applying a filler material to the slots of a segmented commutator by applying pressure to the filler material and thereby extruding the filler material into the slots of a commutator tightly confined on an outside diameter of the commutator.

10. The process of claim 7 and further comprising applying an insulating filler material to the slots of a segmented commutator by applying pressure to the filler material and forcing the insulating filler material into the slots of a rotating commutator through a nozzle shaped to fit the commutator outer contour.

11. The process of claim 2 and further comprising cutting commutator segments in the same operation to the same outer diameter to provide a smooth, continuous, surface for the brushes to act against.

12. The process of claim 4, and further comprising cutting commutator segments in the same operation to the same outer diameter to provide a smooth, continuous surface for the brushes to act against.

13. The process of claim 11, and further comprising making multiple cuts and polishing the filled commutator to achieve a more highly improved surface finish and concentricity and thereby further reducing the audible noise of the device.

14. The process of claim 12, and further comprising making multiple cuts and polishing the filled commutator to achieve a more highly improved surface finish and

concentricity and thereby further reducing the RFI electronic operating noise of the device.

15. A noise reduced electric power conversion device comprising a commutator having segments separated by slots spaced around the external surface of the commutator, wherein the slots are filled with an insulating material to thereby provide a smooth brush transition between the slots and brush of a motor during electric power conversion.

16. An electric motor having a noise reduced electric power conversion device, wherein the device comprises a commutator having segments separated by slots spaced around the external surface of the commutator, wherein the slots are filled with an insulating material to thereby provide a smooth brush transition between the slots and brush of a motor during electric power conversion.

17. An assembly for producing a noise reduced electric power conversion device, the assembly comprising a tight sleeve sized and shaped appropriately for receiving a commutator, the commutator having slots between segments on the outer surface of the commutator, and an extruder to force insulating filler material under pressure into the slots of the commutator.

18. The assembly of claim 17, and further comprising a piston mechanism to thereby apply force, a fixture, an armature supported by the fixture so that the commutator can be inserted into the sleeve of the extrusion device, and an accumulation and pressure chamber for the insulating filler material to thereby provide pressurized feed into the commutator slots.

19. An assembly for producing a noise reduced electric power conversion device, the assembly comprising a machining device having a cutting tool disposed in movable contact with the surface of a commutator having insulating material filled slots when an armature with such commutator is supported on the assembly, a drive

device and a V-block fixture to support the armature assembly by shaft ends of the armature assembly and allow the armature to rotate about its shaft axis when driven by the drive device, the cutting tool being movable parallel to the armature shaft axis so that the cutting tool lightly contacts the commutator to remove material and provide a smooth surface on the commutator segments, to thereby produce high precision motors with low operating noise relative to conventional motors without filled commutator slots.